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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,608	02/23/2004	Joseph M. DeSimone	5470.351DV	8320

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EXAMINER

ZEMEL, IRINA SOPHIA

ART UNIT	PAPER NUMBER
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1711

DATE MAILED: 02/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

10/784,608

Applicant(s)

DESIMONE ET AL.

Examiner

Irina S. Zemel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2-23-04</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-7, 9-17, 19 and 20 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for polymers such as those specifically claimed in claims 8 and 18, does not reasonably provide enablement for any polymeric matrices having cells with the claimed size diameter. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. While enabling for certain polymers, the specification provides no guidance how to obtain polymeric structure that fall within the scope of the claimed structures but are made from different polymeric matrices such as, for example, organic-inorganic silicone based polymers. It will require undue experimentation to determine which polymeric structures of all existing nanoporous structures are within the scope of the claimed invention and how to make such structures for different polymers.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8 and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which

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applicant regards as the invention. Claims 8 and 18 recite a trademark SiLK in the body of the claim. Such recitation is not appropriate and should be substituted with the proper chemical definition of the claimed compound. Furthermore, the polymeric material currently sold by Dow Chemical under the claimed trademark SiLK is a polyarylene-ether. A polyarylene-ether is already listed as a member of the recited Markush group. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-7, 9, 11-17 and 19 are rejected under 35 U.S.C. 102(a) as being anticipated by Low Dielectric Constant Materials for Advanced Microelectronics, IBM Research, (hereinafter "IBM Research").

IBM Research discloses polymeric structures comprising a polymeric matrix based on organosiloxanes. The matrix contains voids or close cells with the cell size of 5-10 nm, and the matrix exhibits a dielectric constant of 1.95 and below. The polymeric material is used for microprocessors, or microelectronic devices. See the entire document, especially the drawings and description on page 2.

Claims 1-8, and 11-18 are rejected under 35 U.S.C. 102(e) as being anticipated by US 2003/0006477 to Gallagher et al., (hereinafter "Gallagher").

Gallagher discloses porous dielectric polymeric materials with low dielectric constant and microelectronic devices comprising such materials, wherein the materials comprise a polymeric matrix having plurality of closed cells with the average diameter of the cells of between 3 to amount 15 nm (see [0051]) and exemplified as between 3 and 11 nm. See Table 1 in [0106]. The polymeric materials disclosed by the reference include polyimides, polyarylene ethers, fluoropolymers, etc., as described in [0024]. SiLK™ polymeric matrix, for example, is used in illustrative example 3. Therefore, the invention as claimed, is fully anticipated by the disclosure of the reference.

Claims 1,2 6-9, 11, 12, 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 6,187,248 to O'Neill et al (hereinafter "O'Neill").

O'Neill discloses porous dielectric polymeric materials with low dielectric constant and microelectronic devices comprising such materials, wherein the materials comprise

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a polymeric matrix having plurality of closed cells with the average diameter of the cells of than 30 nm, see column 4, lines 45-48 and exemplifies structures with pore diameter of less than 20 nm. See Tables 1 and 4. In the same tables, the dielectric constant is reported as low as 1.67 and up. The polymeric materials disclosed by the reference include polyarylene ethers as disclosed in column 6, line 45, et seq.. Therefore, the invention as claimed, is fully anticipated by the disclosure of the reference.

Claim Rejections - 35 USC § 102/103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9-10 and 19-20 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Gallagher.

The disclosure of Gallagher is discussed above. The reference does not expressly address the dielectric constant or the density of the porous dielectric polymeric materials of the invention. However, in view of the disclosed porosity, and the starting polymeric materials, it is reasonably believed that the disclosed materials (at least the materials based on polyarylene ethers) inherently exhibit the dielectric constant and the density corresponding to the claimed parameters. The burden is shifted to the applicants to provide factual evidence to the contrary.

Claims 10 and 20 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over O'Neill.

The disclosure of O'Neill is discussed above. The reference does not expressly address the the density of the porous dielectric polymeric materials of the invention. However, in view of the disclosed porosity, and the starting polymeric materials, it is reasonable believed that the disclosed materials inherently exhibit density corresponding to the claimed parameters. The burden is shifted to the applicants to provide factual evidence to the contrary.

Information Disclosure Statement

The IDS submitted on February 23, 2004 contains from PTO-1449 that has been already considered and initialed by the examiner of the parent application. Thus, with the exception of the last two documents, the IDS was not initialed by the examiner of this application.

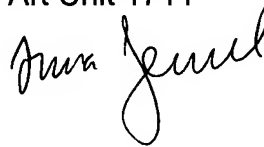
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irina S. Zemel whose telephone number is (571)272-0577. The examiner can normally be reached on Monday-Friday 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (571)272-1078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Irina S. Zemel
Examiner
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A handwritten signature in black ink, appearing to read "Irina Zemel", written in a cursive style.

ISZ